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A SYSTEM FOR MAKING WALLS

"EXPRESS MAIL" MAILING LABEL

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Cross-Reference to Related Applications

[0001] This application is entitled to the benefit of and incorporates by reference essential subject matter disclosed in Provisional Patent Application No. 60/404,631 filed on August 19, 2002.

Field of the Invention

[0002] The present invention is generally related to the construction of walls, and is more particularly directed to a combination of components whereby wells having complex contours can be easily constructed.

Background of the Invention

[0003] In general, buildings, as well as exterior and interior walls, are constructed using linear, e.g. substantially straight, materials. For example, framing lumber and steel studs and beams are typically supplied in a rectilinear configuration. When building walls, these materials are usually set at right angles to one another to form square or rectangular interior spaces. A difficulty occurs when a builder, homeowner, or architect wishes to incorporate curved walls into a structure.

[0004] Walls are most often constructed by attaching a base plate or shoe and one or two plates to a number of studs usually spaced 16 to 24 inches apart. These standard walls are usually built on a floor in a prone position and then "stood up" into place. Historically, this has not been the situation where curved walls are desired.

[0005] In the past, curved walls were built in place on a curved, custom cut, base plate. If, for example, a curved wall was to be made using 2 inch by 4 inch material a large number of consecutive cuts had to be made in the base and top plates in order to allow the material to be bent into an arc. This can be extremely tedious and time consuming and results in pieces of material with little to no structural integrity. In addition, since most of the material is lost to the cuts that must be made, attachment to studs or wall board is difficult if not impossible. Accordingly, the walls must be sheathed in a material with sufficient strength and rigidity to compensate for that loss in the base and top plates. Usually this requires

the use of plywood or like material. Depending on the size and radius of the curve several sheets of plywood may be required. This causes a great deal of waste to be generated.

[0006] Another difficulty sometimes occurs regarding the building of straight walls. It can be difficult, particularly when remodeling existing structures to frame a wall and have it fit exactly between two existing walls. This is due in part to the fact that existing walls are rarely straight. In addition, human error can also be an issue. Accordingly, there is presently a need for a manner by which one can adjust the length of a wall once it is built so that precise fits between existing walls can be accomplished.

[0007] Based on the foregoing, it is the general object of the present invention to overcome or improve upon the problems and drawbacks of the prior art.

Summary of the Invention

[0008] The present invention resides in one aspect in a system for making walls that includes at least two pairs of connector plates each incorporating means for receiving an end of a structural member, such as, but not limited to wooden or metal studs. At least two spacer plates are also provided so that during the construction of a wall successively positioned connector plates can be rotatably coupled to one another by at least one of said spacer plates.

[0009] To form a wall, a pair of connector plates is coupled via the retaining means, one to each of a pair of generally opposing ends defined by each structural member. The connector plates being rotatably movable relative to the spacer plates thereby allowing the structural members to be oriented relative to one another so as to form an arcuate surface when a wall-forming material is fastened to, and extends between the structural members.

[0010] Preferably, each of the spacer plates defines adjustment means for selectively increasing or decreasing the distance between successive stud connector plates. In the preferred embodiment of the present invention, the adjustment means takes the form of at least one elongated slot extending through the spacer plates. A fastener extends through one of the connector plates in each of the at least two pairs of connector plates and a portion of the fastener is slidably and rotatably positioned in the elongated slot. In this manner, the spacer plate and the

connector plate are movable relative to one another, rotatably, and along the slot to allow the distance between, and the relative orientation of successive connector plates to be desirably configured. If greater adjustability is required, a pair of spacer plates can be interposed between each of the connector plates with the slots defined by each connector plate slidably cooperating with one another.

[0011] A pair of structural straps can also be provided each extending between, engaging and being coupled to an outer surface defined by each of the connector plates. Preferably, one of the structural straps is positioned adjacent to, and extends approximately perpendicular to, one distal end defined by the structural members, and the other of the structural straps is positioned adjacent to, and extends approximately perpendicular to, a generally opposing distal end defined by the structural members.

[0012] In the preferred embodiment of the present invention, a second pair of structural straps is provided each positioned adjacent to, and extending approximately perpendicular to, one distal end defined by the structural members. Each of the second pair of structural straps being positioned approximately opposite a corresponding structural strap from the first pair.

[0013] An advantage of the present invention is that walls having complex contours can be easily, quickly and economically fabricated.

[0014] Another advantage of the present invention is that the overall length defined by a wall can be adjusted to exactly fit between, and mate to, existing walls.

Brief Description of the Drawings

[0015] FIG. 1 is a partial perspective view of a wall built using the system of the present invention, the wall is shown having a single piece of sheet type material attached thereto.

[0016] FIG. 2 is a plan view of a connector plate.

[0017] FIG. 3 is a front elevation of the connector plate of FIG. 2.

[0018] FIG. 4 is a side elevational view of the connector plate of FIG. 2.

[0019] FIG. 5 is a plan view of an embodiment of a spacer plate of the present invention.

[0020] FIG. 6 is a cross sectional plan view of a curved wall fabricated in accordance with an embodiment of the present invention.

[0021] FIG. 7 is a cross sectional plan view of a curved wall fabricated in accordance with an embodiment of the present invention.

[0022] FIG. 8 is a plan view of a portion of an embodiment of the system for making walls of the present invention.

[0023] FIG. 9 is a partial view of a structural strap used in the system for making walls of the present invention.

[0024] FIG. 10 is a plan view of an end connector of the present invention.

Detailed Description of the Preferred Embodiments

[0025] As shown in FIG. 1 a curved wall made in accordance with the present invention is generally designated by the reference number 10 and includes a plurality of connector plates 12. A spacer plate 14 is interposed between and rotatably coupled to successive connector plates 12. Referring to FIGS. 1-4, each connector plate 12 defines a receptacle portion 16 for receiving a structural member 18, such as, but not limited to a wooden or metal stud. In the embodiment illustrated in FIG. 1, a connector plate 12 is attached to opposing distal ends of a portion of the structural members. Where a structural member 18 abuts another wall or a longer structural member, an end connector 20, as shown in FIG. 10 is attached to the structural member to provide a flush fit. The connector plates 12, spacer plates 14 and end connectors 20 are each made from a suitable material, such as, but not limited to metal, plastic, or a fiber reinforced composite material, however, the present invention is not limited in this regard.

[0026] As shown in FIGS. 1 and 9, structural straps 20 are attached to the structural members 18 via fasteners (not shown) at a lower distal end and extend in a direction approximately perpendicular to the structural members. The structural

straps 20 are positioned generally opposite one another and provide stability to the wall during construction. While an upstanding wall has been shown and described, the present invention is not limited in this regard as horizontal surfaces or other curved horizontal surfaces having complex contours can also be fabricated using the system of the present invention without departing from the broader aspects thereof. Furthermore, while structural straps 20 have been shown only being positioned at a lower portion of a wall, the present invention is not limited in this regard as the structural straps can, and preferably are also positioned at an upper portion of the wall.

[0027] To fabricate a wall employing the present invention the wall can be framed while lying on a horizontal with the straps 20 fastened in place. Note that in the illustrated embodiment, the straps 20 define slots 22 extending therethrough. The slots 22 allow relative motion between the structural members coupled to the connector plates 12 and the structural straps 22. The relative motion allows the wall 10 to be manipulated to conform to a desired shape The wall 10, once in an upstanding position can be fastened to a floor and/or ceiling by fasteners (not shown) that extend through apertures 24 defined by the connector plates. Likewise, the connector plates 12 can be attached via fasteners (not shown) that extend through connector plates via slots 26, 28, and 30 defined by a bottom, side and front surface, 32, 34, and 36 respectively, defined by the connector plates.

[0028] As shown in FIGS. 1 and 6, wall board 38, or other sheet-type wall covering known to those skilled in the pertinent art to which the present invention pertains, can be attached to the wall. FIGS. 6 and 7 illustrate tight radiused curves, FIG. 7 illustrates the same configuration as in FIG. 6 but employing larger structural members 18. The spacer plates 14 shown in the illustrated embodiments each define apertures 40 to allow for the passage of fasteners (not shown) there through to secure the wall 10 to a floor or ceiling. In addition, the spacer plates 14 each defines knock-out portions 42 retained in the spacer plate by frangible nicks 44. If desired the knock out portions 42 can be removed from the spacer plates to allow conduits, wires, or the like to pass therethrough. While a single spacer plate 14 positioned between successive connector plates 12 has been shown and described, the present invention is not limited in this regard as two or more spacer plates can be attached to one another and positioned between successive connector

plates to allow one to achieve a desired contour or distance between structural members.

[0029] A second embodiment of the system for making walls of the present invention, shown in FIGS. 5 and 8, is generally designated by the reference numeral 110. The system 110 is similar in many respects to the system 10 described above, and therefore like reference numerals preceded by the number 1 are used to indicate like elements. The system 110 differs from the system 10 in that a pair of spacer plates 114 is positioned between successive connector plates 112. As best seen in FIG. 5, the spacer plate 114 defines an angled slot 150 extending there through. Referring back to FIG. 8, consecutively positioned spacer plates 114 are oriented such that the slot 150 in one of the spacer plates, overlaps the slot 150 in the adjacent spacer plate. A fastener 152, such as, but not limited to, a pin, rivet, or a nut and bolt combination extends through the two adjacent spacer plates 114 slidably and rotatably coupling them together. While a spacer plate incorporating a single slot has been shown and described, the present invention is not limited in this regard as a pair of generally opposed slots 150, not shown, can also be employed with one of the slots being slidably and rotatably coupled to a connector plate 112 via a fastener (not shown). Moreover, any number of spacer plates 114 can be attached to one another to enable one to form a desired arcuate shape, or establish a desired spacing between consecutive structural members. During use of the above-described system, complex arcuate contours can be readily created, or straight walls created, and lengthened or shortened as desired.

[0030] While preferred embodiments have been shown and described, various modifications and substitutions may be made without departing from the spirit and scope of the present invention. Accordingly, it is to be understood that the present invention has been described by way of example, and not by limitation.